Lustre Interoperability

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Interoperability Overview

Bug #:

- Bug 11930: for wire protocol (done)
  - Fid alloc, fld
- Bug 11824 for 1.8 recovery, 17911 for 2.0
- Bug 11826: 2.0 changes tracking
  - lgif
  - Mount (config log and disk files)
  - Fid in EA
  - Orphan
  - Readdir
  - Object in group zero

Interoperability Overview (cont.)

- Motivation
  - Make main releases interoperable
- Objectives:
  - Full & seamless interoperability beteewn 1.6 & 1.8: same code base
    - ptlrpc_body
    - AT enabled in 1.8
  - Simplified interoperation between 1.8 & 2.0
    - 1.8 clients + 2.0 servers
    - Upgrade order: mds, oss, clients
    - Downgrade order: clients, oss, mds

Interoperability Overview (cont.)

Design Highlights

- Default, 2.0 uses the same disk format as 1.8
  - For 2.0 CMD, IAM disk, not compatible.
- 1.8 client speaks both 1.8 protocol and 2.0 protocol
- The same code base in HEAD to handle IOP and CMD

1.8 client changes

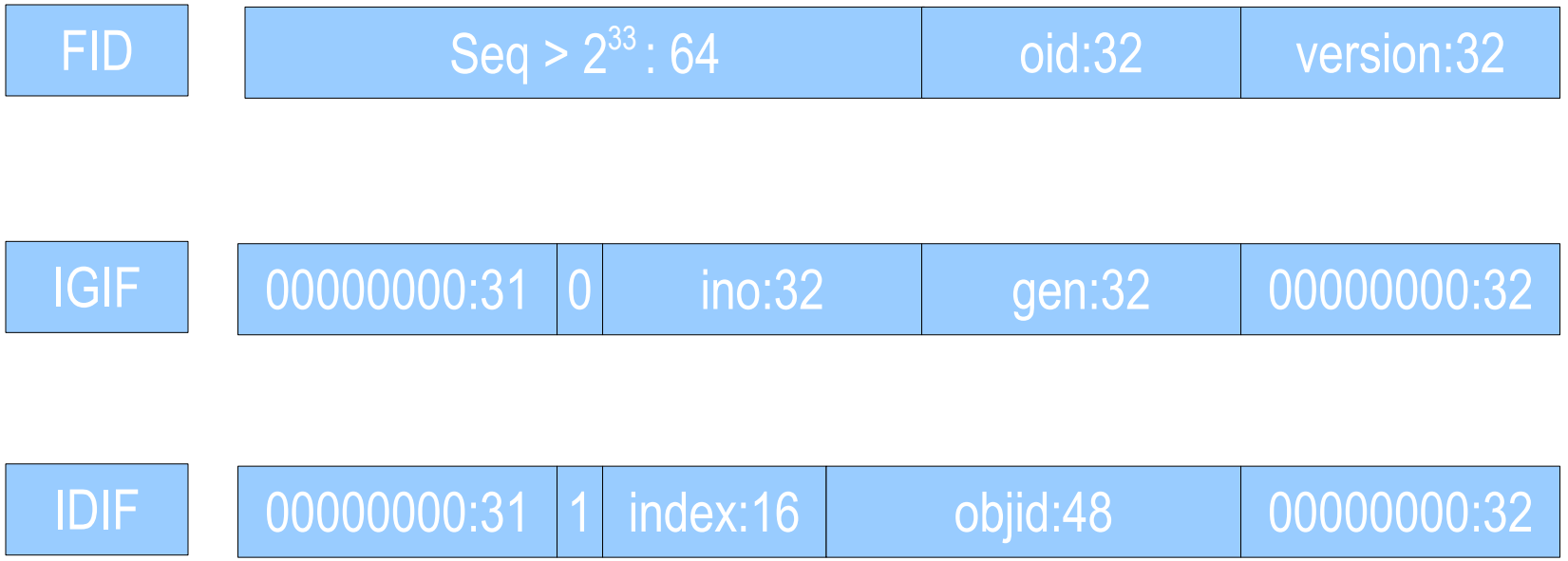
- OBD_CONNECT_FID flag
  - In mdc/osc, packing different request according talking to 1.8 servers or 2.0 servers, parsing different reply.
    - mdt_body instead of mds_body
    - mdt_rec_* have the same size
  - In mdc, allocate FID for new file if needed while talking to 2.0
- Use 2.0 recovery algorithm while talking to 2.0

2.0 changes

- IOP mode (default, disk compatible)
  - Standard ext3/4 directory format
  - Store FID in EA: trusted.lma
  - The same orphan list format as 1.8
  - Objects are created in group 0
  - Generic local objects handling
- CMD mode
  - IAM disk format:
    - directory format: {name, fid}
    - Objects are in group 0, 3, 4, 5, ...
  - IAMDIR=yes, mkfs.lustre --iam-dir
- The same wire protocol and code base

FID, IGIF, IDIF

Some special FID are reserved.



Use case: create

- Create request: parent FID, name, child FID
- Lookup and permission checking
- Create ost objects
- Create file/dir/... on mds:
  - store fid in EA if needed (IOP)
  - Insert object index
- Add dir entry

Use case: readdir

- MDS_READPAGE from client to mdt
- Interate over directory from specified position:
  - IOP: {name, ino}, retrieve FID from EA, IGIF if needed.
  - CMD: {name, FID}
- Pages of {name, FID} are returned

2.0 changes for lprocfs

/proc/fs/lustre/mds -> mdt

/proc/fs/lustre/mds -> osd

blocksize filesfree filestotal fstype kbytesavail kbytesfree kbytestotal

mntdev

/proc/fs/lustre/osc/lustre-OST0000-osc-MDT0000/

/proc/fs/lustre/lov/lustre-MDT0000-mdtlov/

Current Staus

- Interop for 1.6 & 1.8: full
- Interop for 1.8.0 and 2.0 (HEAD)
  - 1.8.0 client talks well to 2.0 servers
  - 2.0 is full compatible with 1.8 disk
  - upgrade/downgrade: cold, or no replay/resend
- Simplified interoperation enables live upgrade
  - Targeted to land to 1.8.1 and 2.0
  - Some changes are expected.

Use case: Upgrade

Upgrade all clients & servers to 1.8.x

Upgrade mds to 2.0: a normal failover

Upgrade oss to 2.0: a normal failover

Upgrade clients to 2.0: mixed versions are allowed

No error, no client/server eviction

Use case: Downgrade

- All clients/servers are 2.0
- Downgrade ALL clients to 1.8.x
- Downgrade OSS to 1.8.x: normal failover
- Downgrade MDS to 1.8.x: normal failover, abort recovery
- Clients are evicted, reconnection

Resources

Arch page:

- http://arch.lustre.org/index.php?title=Interoperability_fids_zfs
- http://arch.lustre.org/index.php?title=Simplified_Interoperation

HLD and DLD

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THANK YOU